



SEQUENCE LISTING

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Mueller, Joerg P.
Van Dijl, Jan M.

<120> Twin-Arginine Translocation in Bacillus

<130> GC634-2

<140> US 09/954,737
<141> 2001-09-17

<150> US 60/233,610
<151> 2000-09-18

<160> 29

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<213> Escherichia coli

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Gly Ala Ser Ile Lys Gly Phe Lys Lys Ala Met Ser Asp Asp Glu Pro
35 40 45
Lys Gln Asp Lys Thr Ser Gln Asp Ala Asp Phe Thr Ala Lys Thr Ile
50 55 60
Ala Asp Lys Gln Ala Asp Thr Asn Gln Glu Gln Ala Lys Thr Glu Asp
65 70 75 80
Ala Lys Arg His Asp Lys Glu Gln Val
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<210> 2
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<213> Escherichia coli

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Val Leu Leu Phe Gly Thr Lys Lys Leu Arg Thr Leu Gly Gly Asp Leu
20 25 30
Gly Ala Ala Ile Lys Gly Phe Lys Lys Ala Met Asn Asp Asp Ala
35 40 45
Ala Ala Lys Lys Gly Ala Asp Val Asp Leu Gln Ala Glu Lys Leu Ser
50 55 60
His Lys Glu

65

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<211> 57
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<213> *Bacillus subtilis*

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Ile Ile Phe Gly Pro Lys Lys Leu Pro Glu Leu Gly Lys Ala Ala Gly
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35 40 45
Glu Glu Glu Lys Lys Glu Asp Gln
50 55

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<213> *Bacillus subtilis*

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Ala Ile Ile Ile Phe Gly Pro Ser Lys Leu Pro Glu Ile Gly Arg Ala
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Ala Lys Arg Thr Leu Leu Glu Phe Lys Ser Ala Thr Lys Ser Leu Val
35 40 45
Ser Gly Asp Glu Lys Glu Glu Lys Ser Ala Glu Leu Thr Ala Val Lys
50 55 60
Gln Asp Lys Asn Ala Gly
65 70

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<213> *Bacillus subtilis*

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Leu Val Phe Gly Pro Asp Lys Leu Pro Ala Leu Gly Arg Ala Ala Gly
20 25 30
Lys Ala Leu Ser Glu Phe Lys Gln Ala Thr Ser Gly Leu Thr Gln Asp
35 40 45
Ile Arg Lys Asn Asp Ser Glu Asn Lys Glu Asp Lys Gln Met
50 55 60

<210> 6
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<212> PRT
<213> *Escherichia coli*

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Leu Val Val Leu Gly Pro Gln Arg Leu Pro Val Ala Val Lys Thr Val
 20 25 30
 Ala Gly Trp Ile Arg Ala Leu Arg Ser Leu Ala Thr Thr Val Gln Asn
 35 40 45
 Glu Leu Thr Gln Glu Leu Lys Leu Gln Glu Phe Gln Asp Ser Leu Lys
 50 55 60
 Lys Val Glu Lys Ala Ser Leu Thr Asn Leu Thr Pro Glu Leu Lys Ala
 65 70 75 80
 Ser Met Asp Glu Leu Arg Gln Ala Ala Glu Ser Met Lys Arg Ser Tyr
 85 90 95
 Val Ala Asn Asp Pro Glu Lys Ala Ser Asp Glu Ala His Thr Ile His
 100 105 110
 Asn Pro Val Val Lys Asp Asn Glu Ala Ala His Glu Gly Val Thr Pro
 115 120 125
 Ala Ala Ala Gln Thr Gln Ala Ser Ser Pro Glu Gln Lys Pro Glu Thr
 130 135 140
 Thr Pro Glu Pro Val Val Lys Pro Ala Ala Asp Ala Glu Pro Lys Thr
 145 150 155 160
 Ala Ala Pro Ser Pro Ser Ser Asp Lys Pro
 165 170

<210> 7
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 <213> Escherichia coli

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 Arg Lys Arg Leu Leu Asn Cys Ile Ile Ala Val Ile Val Ile Phe Leu
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 Cys Leu Val Tyr Phe Ala Asn Asp Ile Tyr His Leu Val Ser Ala Pro
 35 40 45
 Leu Ile Lys Gln Leu Pro Gln Gly Ser Thr Met Ile Ala Thr Asp Val
 50 55 60
 Ala Ser Pro Phe Phe Thr Pro Ile Lys Leu Thr Phe Met Val Ser Leu
 65 70 75 80
 Ile Leu Ser Ala Pro Val Ile Leu Tyr Gln Val Trp Ala Phe Ile Ala
 85 90 95
 Pro Ala Leu Tyr Lys His Glu Arg Arg Leu Val Val Pro Leu Leu Val
 100 105 110
 Ser Ser Ser Leu Leu Phe Tyr Ile Gly Met Ala Phe Ala Tyr Phe Val
 115 120 125
 Val Phe Pro Leu Ala Phe Gly Phe Leu Ala Asn Thr Ala Pro Glu Gly
 130 135 140
 Val Gln Val Ser Thr Asp Ile Ala Ser Tyr Leu Ser Phe Val Met Ala
 145 150 155 160
 Leu Phe Met Ala Phe Gly Val Ser Phe Glu Val Pro Val Ala Ile Val
 165 170 175
 Leu Leu Cys Trp Met Gly Ile Thr Ser Pro Glu Asp Leu Arg Lys Lys
 180 185 190
 Arg Pro Tyr Val Leu Val Gly Ala Phe Val Val Gly Met Leu Leu Thr
 195 200 205
 Pro Pro Asp Val Phe Ser Gln Thr Leu Leu Ala Ile Pro Met Tyr Cys
 210 215 220
 Leu Phe Glu Ile Gly Val Phe Phe Ser Arg Phe Tyr Val Gly Lys Gly
 225 230 235 240

Arg Asn Arg Glu Glu Asn Asp Ala Glu Ala Glu Ser Glu Lys Thr
245 250 255
Glu Glu

<210> 8
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<213> Bacillus subtilis

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Phe Ile Ala Gly Phe Phe Leu Ala Lys Pro Ile Ile Val Tyr Leu Gln
35 40 45
Glu Thr Asp Glu Ala Lys Gln Leu Thr Leu Asn Ala Phe Asn Leu Thr
50 55 60
Asp Pro Leu Tyr Val Phe Met Gln Phe Ala Phe Ile Ile Gly Ile Val
65 70 75 80
Leu Thr Ser Pro Val Ile Leu Tyr Gln Leu Trp Ala Phe Val Ser Pro
85 90 95
Gly Leu Tyr Glu Lys Glu Arg Lys Val Thr Leu Ser Tyr Ile Pro Val
100 105 110
Ser Ile Leu Leu Phe Leu Ala Gly Leu Ser Phe Ser Tyr Tyr Ile Leu
115 120 125
Phe Pro Phe Val Val Asp Phe Met Lys Arg Ile Ser Gln Asp Leu Asn
130 135 140
Val Asn Gln Val Ile Gly Ile Asn Glu Tyr Phe His Phe Leu Leu Gln
145 150 155 160
Leu Thr Ile Pro Phe Gly Leu Leu Phe Gln Met Pro Val Ile Leu Met
165 170 175
Phe Leu Thr Arg Leu Gly Ile Val Thr Pro Met Phe Leu Ala Lys Ile
180 185 190
Arg Lys Tyr Ala Tyr Phe Thr Leu Leu Val Ile Ala Ala Leu Ile Thr
195 200 205
Pro Pro Glu Leu Leu Ser His Met Met Val Thr Val Pro Leu Leu Ile
210 215 220
Leu Tyr Glu Ile Ser Ile Leu Ile Ser Lys Ala Ala Tyr Arg Lys Ala
225 230 235 240
Gln Lys Ser Ser Ala Ala Asp Arg Asp Val Ser Ser Gly Gln
245 250

<210> 9
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<212> PRT
<213> Bacillus subtilis

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20 25 30
Ala Phe Leu Phe Val Gln Asp Ile Tyr Asp Trp Leu Ile Arg Asp Leu
35 40 45
Asp Gly Lys Leu Ala Val Leu Gly Pro Ser Glu Ile Leu Trp Val Tyr

50	55	60
Met Met Leu Ser Gly Ile Cys Ala Ile Ala Ala Ser Ile Pro Val Ala		
65	70	75 80
Ala Tyr Gln Leu Trp Arg Phe Val Ala Pro Ala Leu Thr Lys Thr Glu		
85	90	95
Arg Lys Val Thr Ile Met Tyr Ile Met Tyr Ile Pro Gly Leu Phe Ala		
100	105	110
Leu Phe Leu Ala Gly Ile Ser Phe Gly Tyr Phe Val Leu Phe Pro Ile		
115	120	125
Val Leu Ser Phe Leu Thr His Leu Ser Ser Gly His Phe Glu Thr Met		
130	135	140
Phe Thr Ala Asp Arg Tyr Phe Arg Phe Met Val Asn Leu Ser Leu Pro		
145	150	155 160
Phe Gly Phe Leu Phe Glu Met Pro Leu Val Val Met Phe Leu Thr Arg		
165	170	175
Leu Gly Ile Leu Asn Pro Tyr Arg Leu Ala Lys Ala Arg Lys Leu Ser		
180	185	190
Tyr Phe Leu Leu Ile Val Val Ser Ile Leu Ile Thr Pro Pro Asp Phe		
195	200	205
Ile Ser Asp Phe Leu Val Met Ile Pro Leu Leu Val Leu Phe Glu Val		
210	215	220
Ser Val Thr Leu Ser Ala Phe Val Tyr Lys Lys Arg Met Arg Glu Glu		
225	230	235 240
Thr Ala Ala Ala Ala		
	245	

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<212> PRT
<213> Bacillus alcalophilus

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Leu Leu Ile Phe Gly Pro Lys Lys Leu Pro Glu Leu Gly Lys Ala Ala		
20	25	30
Gly Ser Thr Leu Arg Glu Phe Lys Asn Ala Thr Lys Gly Leu Ala Asp		
35	40	45
Asp Asp Asp Asp Thr Lys Ser Thr Asn Val Gln Lys Glu Lys Ala		
50	55	60

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<213> Bacillus alcalophilus

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20	25	30
His Ala Glu Glu Leu Arg Arg Ile Phe Val Val Leu Ala Phe Phe		
35	40	45
Ile Val Ala Leu Ile Gly Gly Phe Phe Leu Ala Val Pro Val Ile Thr		
50	55	60
Phe Leu Gln Asn Ser Pro Gln Ala Ala Asp Met Pro Phe Asn Ala Phe		
65	70	75 80

Arg	Leu	Thr	Asp	Pro	Leu	Arg	Val	Tyr	Met	Asn	Phe	Ala	Val	Ile	Thr
															85
															90
															95
Ala	Leu	Val	Leu	Ile	Ile	Pro	Val	Ile	Leu	Tyr	Gln	Leu	Trp	Ala	Phe
															100
															105
															110
Val	Ser	Pro	Gly	Leu	Lys	Glu	Asn	Glu	Gln	Lys	Ala	Thr	Leu	Ala	Tyr
															115
															120
															125
Ile	Pro	Ile	Ala	Phe	Leu	Leu	Phe	Leu	Ala	Gly	Ile	Ala	Phe	Ser	Tyr
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															135
															140
Phe	Ile	Leu	Leu	Pro	Phe	Val	Ile	Ser	Phe	Met	Gly	Gln	Met	Ala	Asp
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															155
Arg	Leu	Glu	Ile	Asn	Glu	Met	Tyr	Gly	Ile	Asn	Glu	Tyr	Phe	Ser	Phe
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															170
Leu	Phe	Gln	Leu	Thr	Ile	Pro	Phe	Gly	Leu	Leu	Phe	Gln	Leu	Pro	Val
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															185
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Val	Val	Met	Phe	Leu	Thr	Arg	Leu	Gly	Val	Val	Thr	Pro	Thr	Phe	Leu
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															205
Arg	Lys	Ile	Arg	Lys	Tyr	Ala	Tyr	Phe	Ala	Leu	Leu	Val	Ile	Ala	Gly
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															215
															220
Ile	Ile	Thr	Pro	Pro	Glu	Leu	Thr	Ser	His	Leu	Phe	Val	Thr	Val	Pro
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Met	Leu	Ile	Leu	Tyr	Glu	Ile	Ser	Ile	Thr	Ile	Ser	Ala	Ile	Thr	Tyr
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															250
Arg	Lys	Tyr	His	Gly	Thr	Thr	Asp	His	Asn	Gly	Gln	Glu	Ser	Ala	Lys
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<220>
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